

Furniture Detective: TEACHER GUIDE

1. Collect at least one old piece of furniture or a part of a piece of furniture; make sure that the furniture is made from either wicker (note: wicker is derived from one of several types of willows), bamboo, or rattan palm.

► The piece of furniture you collect will be your murder weapon. For example, if you collect wicker furniture made from willow, students will observe a piece of the wicker furniture. The students should then conclude that the murder weapon was willow and most likely came from suspect 2, the suspect that works in a wicker factory.

► The problem: A body is discovered with a piece of furniture imbedded in the torso. Three suspects each work in different furniture factories. Suspect 1 works in a rattan factory, suspect 2 works in a wicker factory and suspect 3 works in a bamboo factory. Which suspect has easiest access to the murder weapon?

2. Cut the furniture into pieces approximately 6 in. – 1 ft. long. The surface of the cut end (or at least a portion) must be smooth enough to see the wood pores or vascular bundles. Sand with fine sandpaper or slice the surface with a single edge razor or box cutter so that the surface is very smooth. Give each student or group of students a piece of the furniture.

3. Students may use a hand lens or dissecting scope (optional).

Handouts:

Growth in the tropics Parts I & II (downloadable teaching module Unit III)

Monocot and Dicot characteristics (downloadable teaching module Unit II)

Student activity sheets (pages 2-4)

Answers to questions on the work sheet:

1. Broad-leaved trees have thickening growth from a cambium. The old stem has, a pith, a core of wood (xylem tissue), a cambium, bark (composed of with phloem and often cork on the very outside).
2. i. xylem, phloem, and fibers; ii. xylem – transports water and provides strength, phloem – transports sugars and amino acids, fibers – provide support and strength.
3. i. Palms can appear hollow because the softer tissue on the inside of the palm stem will decay before the tough fibers on the outside of the palm stem, but healthy palms have solid stems.

characteristic	check if present	Is this characteristic found in willow, bamboo, or rattan palms?
growth rings or a core of xylem tissue		willow
separate vascular bundles		bamboos and rattan palms
hollow stems between nodes and nodes with a solid region of tissue		bamboo only
surface rings caused by leaf scars		bamboo and rattan palms
stems solid in both at nodes and between nodes		willow and rattan
nodes without a solid region of tissue		none

Name: _____

Furniture Detective:

Is it made from rattan palm, bamboo or wicker?

Problem

CSI Miami forensic scientists have discovered a body with a piece of furniture imbedded in the torso. Three suspects are involved in the case and each suspect works in a different furniture factory. Suspect 1 works in a rattan factory, suspect 2 works in a wicker factory and suspect 3 works in a bamboo factory. Which suspect has easiest access to the murder weapon? Determining the type of wood will help the investigators link the furniture to a suspect.

Investigate

Most furniture is made from wood. Three plants that are often used for furniture are willow, bamboo, and rattan palm. These look very similar to the untrained eye. However, scientists can tell them apart by looking at their structure and examining their characteristics.

1. **Wicker** is the name for flexible stems of willow or another dicot plant. Dicot trees are called **broad-leaved trees**.

What are three stem characteristics of broad-leaved trees? (see Growth in the tropics Part I, page 2)

i. _____

ii. _____

iii. _____

Wicker stems have a core of xylem tissue and a central pith region. When wicker furniture is made, the bark and cambium are removed during cleaning.

2. Bamboo is a monocot (a giant grass). Monocots have their vascular tissue arranged in bundles that are scattered in the stem (see monocot and dicot characteristics). The very center of bamboo can be hollow, but there are still many scattered bundles in the wall of the stem.

i. What are the three types of tissue in a vascular bundle? (see Growth in the tropics Part II, page 1)

ii. What is the function of each of these types of tissue?

Bamboo also has hollow stems except for a thin, solid region at the node: the ring where the leaf was attached. Nodes are located where you see rings on a stem of bamboo.

3. Rattans are climbing palms with very long stems. Palms are monocots like the bamboo and discriminating between a rattan stem and a bamboo stem can be tricky.

Both bamboos and rattan palms have scattered vascular bundles and the node regions can look very similar. However, rattan palms never have hollow internode regions; the stem is always solid. Both bamboo and rattan stems can be split and the strips used for weaving. When the stems are woven, microscopic examination of the structure of their vascular bundles is required to determine if the wood is rattan palm or bamboo.

i. Bamboo stems are naturally hollow on the inside. Some palm stems can appear hollow too. Why would a palm stem to appear hollow? (Growth in the tropics, Part II, page 4)
